



**The State of Healthcare:
Preparedness Efforts Key to Facing Pandemic
Crisis**

By Kentucky Governor Ernie Fletcher, M.D.
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edition of Medical News*

One of the most important issues facing public health officials in Kentucky and the nation today is the threat of a global influenza pandemic.

Of all the hazards we face right now, pandemic flu has a unique potential to disrupt our lives, our health care system and our economy like no other. Many of our citizens have never witnessed a pandemic's impact firsthand, though we need only look to our history books to find it.

Kentucky's public health officials are taking seriously the potential impact sickness and death could place on the state's health and medical systems.

Pandemic flu is a major threat to the commonwealth's critical infrastructure, as it will remove essential personnel from the workplace for weeks or even months. Because health care workers and others employed in our infrastructure systems like law enforcement, emergency response and public works communities will not be immune to the virus, our day-to-day operations will be in jeopardy.

When Kentucky held its state pandemic planning summit on Jan. 20 in Frankfort, in response to President Bush's plan to mobilize the nation to prepare for an influenza pandemic, I met with U.S. Department for Health and Human Services Deputy Secretary Alex Azar II. We signed a resolution committing the state and federal government to planning efforts addressing pandemic flu preparedness. We have held fast to that commitment.

Representatives from numerous state government agencies have committed themselves to creating a comprehensive plan of action to be used as a guideline for response to pandemic flu. We want to be confident that we can effectively communicate with our citizens – and the health care community – should pandemic flu occur.

The Kentucky Pandemic Influenza Preparedness Plan that was originally developed in 2002 is currently being updated to provide guidelines to state and local health departments on the following issues:

- Command and Management
- Communication and Education
- Transmission of Disease
- Laboratory and Surveillance
- Treatment of Disease
- Health Care Planning
- Psychosocial Considerations

The plan also establishes the framework for ensuring that an effective system of health and medical-related emergency response is in place to contain adverse outcomes of influenza pandemic.

I want you to know what we're doing every step of the way. The state operations plan to deal with pandemic flu, combined with county and city emergency plans, will provide Kentucky with a detailed blueprint to combat and respond to the conse-

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quences of pandemic flu. Our efforts are consistent and supportive of those on the national level. Furthermore, local summits were held across the state to help public health and emergency response communities inform, involve and coordinate with political, economic, education and community leadership in the state's pandemic planning process.

Pandemics are unpredictable. It is hard to know when one will occur, what type of flu it will be or how severe it will be. Influenza viruses do not discriminate, nor are they restrained by state or national boundaries.

The potential for devastation paints a bleak portrait of society. Hope will not prevent the inevitable. We are overdue for pandemic, and someday will face it. That's why I believe we must be prepared, and we must encourage others to be prepared. I believe every step we take together now in pandemic preparedness will result in saved lives in the event of an influenza pandemic.

For more information on Kentucky's Pandemic Influenza Preparedness Plan, visit the Cabinet for Health and Family Services Department for Public Health's Preparedness Branch Web site at <http://chfs.ky.gov/dph/epi/preparedness>.



Kentucky's Pandemic Influenza Planning Efforts

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It is not a question of "if" but "when" another influenza pandemic will occur. Kentucky must be prepared for this and other public health emergencies. To lessen the impact of an influenza pandemic, the Kentucky Department for Public Health (DPH) has created the Kentucky Pandemic Influenza Preparedness Plan to promote an effective response throughout the pandemic event. The plan was originally drafted in 2002, but is being updated through a coordinated effort of DPH, Kentucky Division of Emergency Management (KYEM), Kentucky Office of Homeland Security (KOHS), Kentucky Department of Education (KDE), Kentucky Department of Agriculture (KDA), Kentucky Department of Criminal Justice Training (DOCJT), Kentucky State Police (KSP), Kentucky Chamber of Commerce, universities, local health departments and other partners and stakeholders.

Kentucky's health and medical community has been divided among the fourteen Health Resource Service Administration (HRSA) planning regions, with each region having unique planning and cultural considerations. Even though Kentucky has over four million residents and is geographically and culturally diverse, it is a tightly knit state and public health has built strong relationships with preparedness partners and stakeholders. Understanding and appropriately addressing these facets will allow Kentucky to be as prepared as possible for a public health emergency such as an influenza pandemic.

The Impact of Pandemic Influenza

An influenza pandemic (or global epidemic) occurs when a new virus subtype appears, against which no one is immune. This may result in several simultaneous epidemics worldwide, with high numbers

of cases and deaths. Given the increase in global transport and urbanization, epidemics caused by the new influenza virus are likely to occur rapidly around the world. It is important to understand the difference between the following flu terms:

- *Seasonal (or common) flu* is a respiratory illness that can be transmitted from person-to-person. Most people have some immunity, and a vaccine is available.
- *Avian (or bird) flu* is caused by influenza viruses that occur naturally among wild birds. The H5N1 variant is deadly to domestic fowl and can be transmitted from birds to humans.
- *Pandemic flu* is human-to-human flu that causes a global outbreak or pandemic of serious illness. Because there is little natural immunity, the disease can spread easily from person to person. Currently, there is no pandemic flu.

The impact of a pandemic can be both medical and economic. Figure 1 summarizes the impact of past pandemics and puts into perspective the estimated impact.

Figure 1. Impacts of Influenza Pandemics

Impact of Past Influenza Pandemics

1968-69 Hong Kong Flu (H3N2)-34,000 U.S deaths
 1957-58 Asian Flu (H2N2)-70,000 U.S. deaths
 1918-19 Spanish Flu (H1N1)>500,000 U.S. deaths,
 20-50 million worldwide

Estimated Impact of a Future Influenza Pandemic in the U.S.

- ◇ **Deaths: 89,000 - 207,000**
- ◇ **Hospitalizations: 314,000 - 734,000**
- ◇ **Outpatient visits: 18 - 42 million**
- ◇ **Additional illnesses: 20 - 47 million**
- ◇ **Economic impact: \$71.3 - 166.5 billion**

Community and Individual Preparedness

In preparing for crisis situations such as pandemic influenza, individuals should be able to sustain themselves for at least three days, if not longer. This lesson was learned from the aftermath of Hur-

ricane Katrina, due to the long length of time it took assistance from the governments to arrive. The following basic steps can be followed for sustainment and protection should an outbreak of pandemic influenza occur:

- Washing hands frequently with soap and water or an alcohol-based hand sanitizer.
- Coughing into the elbow or sleeve instead of into hands.
- Social distancing - avoiding crowds and public gatherings, especially if there is an outbreak of influenza in the community.
- Staying at home if sick.
- Limiting travel, especially avoiding countries experiencing known infection of pandemic influenza.
- Taking special precautions when caring for sick family members such as wearing a surgical mask to reduce transmission and spread of the virus.
- Being aware of disease outbreaks in the community by listening to TV or radio broadcasts that provide situation updates.

Other control measures may require the institution of isolation and quarantine. *Isolation* refers to the separation of ill persons with a communicable disease from those who are healthy. *Quarantine* refers to separation or restriction of activities for those who are not ill, but who are believed to have been exposed to a communicable disease and are therefore at a high risk of becoming infected. If community quarantine or isolation becomes necessary, it would be pertinent to have a supply of food and water on hand for sustainment until the threat of infection is past or the quarantine is lifted.

Individuals may undergo several different types of isolation depending on the situation and monitoring may be carried out in the following ways:

- *Self monitoring* - patient status is monitored by the individual.
- *Active monitoring* - patient status is monitored in-person via telephone or video method by the local health department personnel (infection control nurse, epidemiologist or regional epidemiologist).

- *Temporary quarantine* - quarantine lasting a few days or until the results of a diagnostic test becomes available.
- *Longer-term quarantine* - quarantine lasting up to 10 days if a diagnosis of pandemic influenza is confirmed.

If pandemic influenza results in severe illness that overwhelms the capacity of existing healthcare resources, it may become necessary to provide care to these individuals at alternative sites such as schools, auditoriums, conference centers and hotels. The same principles of infection control apply in these settings as in other healthcare settings. There must be support for persons in isolation with essential services of food, water and sanitary needs being provided to those that are quarantined in alternative designated sites.

The travel industry, being aware of the seriousness of a possible pandemic infection, has several plans in place should an outbreak occur. These plans include meeting passengers arriving from area(s) experiencing an avian influenza outbreak, cleaning and disinfecting airlines returning from areas affected by avian influenza and meeting flights with a reported ill passenger. There are notification procedures in place for reporting potential cases to health authorities both at the state and local level.

Having a disaster kit available for every family member is also an important measure. Recommended items to stock in a disaster kit include:

- One gallon of water per person per day
- Food for at least three days, including ready to eat canned or prepackaged meats, fruits and vegetables that do not require refrigeration
- Weather radio that can work with batteries, hand crank or portable generator
- Flashlight
- Spare batteries
- Extra pair of eye glasses or contact lenses
- Extra prescription medication
- Supplies for infants/children (baby formula, diapers)
- Food and medical supplies for pets

Kentucky's Preparedness Efforts and Activities

Many agencies, organizations, and private institutions in Kentucky will need to work in a coordinated and collaborative manner to ensure an effective overall response. Some key players, planning activities and planning assumptions include:

- DPH is the lead agency for preparedness and response to an influenza pandemic in Kentucky.
- Local health departments are critical to planning and response, as all disasters and emergencies are initially local.
- Kentucky Emergency Management and the Kentucky Office of Homeland Security will be important agencies for ensuring overall coordination of government resources.
- First responder agencies have important manpower and logistical resources that will be necessary for ensuring the safety of individuals and communities.
- Hospitals and healthcare institutions will be the frontline of a pandemic and are essential planning partners at the local and state level.
- Volunteer agencies remain important partners in emergency response activities.
- Businesses and schools should collaborate and coordinate with public health officials to help limit the spread of disease.
- A pandemic may last much longer than most other emergency events and may include "waves" of influenza activity separated by months.

Collaborative Efforts

It will be necessary to collaborate with many state and community partners if a pandemic occurs. Listed below are some collaborative activities that have been performed:

- The Kentucky Department of Agriculture (see related article on page 6) is monitoring and performing systematic testing of all commercial and domestic "backyard" flocks, and the Kentucky Department of Fish and Wildlife Resources is responsible for similar tasks with wild bird populations. Random testing of birds will be checked for avian influenza to ensure that the health, welfare and economy of the citizens of the Commonwealth of Kentucky will be protected.

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- The Kentucky Department for Public Health held and sponsored a state-level pandemic summit, in addition to conducting 50 state-wide summits to inform, educate and empower the citizens at the local level. The main goal of the local summits was to make individuals aware of the possibility of a pandemic influenza outbreak and ways in which individuals could protect themselves and their families.

Medication and Treatment

A vaccine would most likely not be available in the early stages of a pandemic. Once a potential pandemic strain of influenza virus is positively identified, it will take several months before a vaccine will be widely available. Two doses will likely be necessary for adequate immunity (Table 1).

Table 1. Pandemic Influenza Vaccine Timeline

Start of Influenza Pandemic	No Vaccine Available
6 Months	Initial Introduction of Influenza Vaccine
1 Year into Pandemic	Adequate Amounts Produced to Vaccinate U.S. Population with 1 Dose
2 Years into Pandemic	Adequate Amounts Produced to Vaccinate U.S. Population with 2 Doses

Standard methods of influenza vaccine production developed more than 50 years ago are labor-intensive. Manufacturing takes approximately 9 months to complete. The current U.S. capacity for manufacturing egg-based vaccines is not sufficient to supply our entire population. In response to recent flu vaccine shortages and a potential pandemic, the U.S. Department of Health and Human Services (HHS) is working with the vaccine industry to determine ways to increase that capacity, including developing new facilities and expanding production in existing facilities. HHS is supporting research into cell-based vaccine manufacturing, which holds the promise of a reliable, flexible, and easily scalable method of producing vaccine domestically. In April 2005, HHS announced a \$97 million contract for the development of cell-based flu vaccine, and is expected to award additional contracts for developing cell-based vaccines next spring.

Antivirals may or may not play an important role in the treatment of pandemic flu depending on the resistance of the actual novel strain. The state plan does incorporate the use of antivirals and provides recommendations for antiviral use, if effective and available.

Conclusion

Pandemic influenza preparedness activities and planning will serve as a guide for the state during the pandemic phases, if and when a pandemic occurs. The goal of planning activities is to prevent illness and death and preserve critical community infrastructures. It is important to respect the potential impact a pandemic poses to all parts of society. Because Mother Nature does not aim, all are at risk during a pandemic. The Kentucky Department for Public Health serves as the lead in this type of event, but will require coordination and collaboration with many state and community-level partners to manage a pandemic. In order to adequately prepare, the Kentucky Department for Public Health encourages all sectors of the Commonwealth to participate in planning, exercising, and responding to pandemic influenza.

Avian Influenza from the Agricultural Perspective

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Avian Influenza (AI) or “bird flu” is an infectious disease of birds and at this time is not proven to transmit readily from human-to-human. Understanding the disease in wild birds and protecting domestic poultry is important, as poultry production is the second largest livestock industry in Kentucky, following the equine industry. Because Kentucky is primarily a rural state, many backyard flocks of poultry are present in most counties, in addition to the commercial poultry industry. The Kentucky Department of Agriculture (KDA) and the United States Department of Agriculture (USDA) work together to meet the needs of these small flock owners and to educate them on protecting their birds and reporting sick birds.

This article will briefly review avian influenza in birds, the types of surveillance for avian influenza that are ongoing, and discuss the safe handling of poultry for food purposes.

Avian influenza viruses are influenza type A viruses, and many species of birds are susceptible to infection. The influenza A viruses are identified by two surface proteins, hemagglutinin (H) and neuraminidase (N). There are 16 different types of hemagglutinin (H) and 9 types of neuraminidase (N) recognized and most are known to infect wild waterfowl. Migratory waterfowl and shorebirds are the primary reservoir hosts for avian influenza viruses, often with no apparent illness from the viruses.

In addition to the H and N characterizations, avian influenza viruses are designated as either low pathogenicity avian influenza (LPAI) or high pathogenicity avian influenza (HPAI). A particular set of amino acids at the H cleavage site identifies a highly pathogenic form of avian influenza. The majority of avian influenza viruses are LPAI causing no illness or minor illness in affected birds. Occasionally an HPAI strain develops which will prove to be highly contagious and cause rapid death loss in affected flocks. Once introduced into a poultry

flock, the H5 and H7 AI strains have the potential to mutate into HPAI strains. However, the North American and Eurasian lineages of AI viruses are genetically different and a North American H5N1 strain may not demonstrate the same activity as the current H5N1 circulating in Asia and Europe.

The current H5N1 strain that has caused severe poultry disease and over 200 human cases of illness in Asia, Indonesia, Africa and a few European countries is a HPAI. This strain of the virus has not been found in the United States. This virus is still an avian virus and most of the people infected had direct contact with diseased poultry.

Birds infected with a LPAI may have ruffled feathers, a drop in egg production, a mild respiratory infection or exhibit no clinical signs at all. In contrast birds infected with HPAI will exhibit severe disease including sudden death, incoordination, respiratory signs, misshapen eggs, diarrhea, swelling and discoloration of wattles and comb and rapid spread within the flock. The mortality for HPAI is 90 to 100%. Avian influenza viruses are shed through the feces and secretions from the nose, mouth and eyes. Bird-to-bird transmission is usually from direct contact with fecal material, but the virus is also spread by the movement of people and equipment contaminated with fecal material.

Within the United States there have only been three occurrences of highly pathogenic avian influenza in domestic poultry and no occurrences in wild birds. The three outbreaks were in 1924, 1983-84 and 2004. The 1924 outbreak was an H7 strain, the 1983-84 an H5N2 strain and the 2004 a nH5N2 strain. The 2004 outbreak was quickly contained and limited to one flock due to good surveillance and a rapid response.

The USDA currently has trade restrictions in place to prevent the importation of poultry or poultry products from any country or area that has found HPAI H5N1 in commercial poultry or domestically raised birds. All live birds from countries that are allowed to export to the U.S. are held in a USDA quarantine facility for 30 days and tested for avian influenza prior to entry. The USDA has also in-

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creased its surveillance for smuggled poultry and poultry products.

Avian Influenza Surveillance

The surveillance for avian influenza in birds in Kentucky is being conducted by the Kentucky Department of Agriculture (KDA), the Kentucky Department of Fish and Wildlife (KyDFW), and the Kentucky Poultry Federation, in cooperation with the U.S. Department of Agriculture (USDA).

The Kentucky Poultry Federation works directly with the commercial poultry industry on LPAI surveillance, which conducts regular testing for LPAI viruses at all levels of the commercial production. Commercial poultry in the U.S. are raised under strict biosecurity with monitoring and inspection to ensure the product in the supermarket is from a healthy flock. Figure 1 provides consumer guidelines for proper handling of poultry products. The avian influenza virus is not transmitted through properly cooked chicken or eggs.

KDA will be conducting random surveillance for LPAI in various domesticated fowl venues. Poultry raised outside of the "commercial poultry industry" is considered a backyard flock. These flocks may be birds raised for meat and egg production, exhibition, game birds or domesticated waterfowl.

Some flocks are members of the National Poultry Improvement Plan (NPIP) and will test birds on a quarterly basis to maintain the U. S. Avian Influenza Clean status. The state has a number of upland game bird breeders who raise birds for hunting preserves, and will be encouraged to participate in the NPIP program and the AI testing available.

A number of producers sell live birds on a regular basis at flea markets and swap meets. These venues do not meet the requirements of a USDA Live Bird Market, but Kentucky will conduct AI surveillance at these sites as this activity allows the commingling of poultry from different areas. The main focus on the AI poultry surveillance will be in areas of the state that are near commercial poultry houses, migratory bird flyways or where waterfowl and chickens are raised together. Kentucky is skirted by one of the major migratory flyways, the

Mississippi flyway, on our far western border.

The KyDFW will be conducting random surveillance on wild birds, with their testing focusing on morbidity/mortality events, high risk areas (near the Mississippi flyway), hunter killed birds and environmental testing. Persons finding dead or sick wild birds, especially water fowl, should report them to the KyDFW (Figure 2).

Significant wild bird testing has begun in Alaska, where the Asian migratory flyway intersects the Pacific migratory flyway. As of June 22, 2006 all specimens tested were negative. If the H5N1 strain of avian influenza is introduced by migratory birds, it will most likely come into Alaska first.

The KDA, KyDFW and USDA are working together on surveillance to respond promptly if the virus is recognized in the state and to contain it and prevent further spread. State residents can be assured that commercial poultry products produced in this country will not be a source of this virus.

Figure 1. Poultry Precautions

Safe Handling and Cooking of Poultry

- Wash hands with warm water and soap for at least 20 seconds before and after handling food.
- Prevent cross-contamination by keeping raw meat, poultry, fish and their juices away from other foods.
- After cutting meats, wash cutting board, knife, and counter tops with hot, soapy water.
- Sanitize cutting boards by using a solution of 1 teaspoon of chlorine bleach in 1 quart of water.
- Use food thermometer to ensure food has reached the safe internal temperature, in all parts of the bird. Cook poultry to at least 165 ° F to kill foodborne germs, including the avian influenza virus.

Figure 2. Bird Reporting Procedures

Reporting Dead or Sick Birds

Wild Birds (waterfowl and songbirds)

- Kentucky Department of Fish and Wildlife
1-800-858-1549, Ext. 352 or <http://fw.ky.gov>
- USDA APHIS Wildlife Services
1-866-4USDAWS

Domestic Poultry and Pet Birds

- Your local veterinarian
- USDA APHIS Veterinary Services
1-866-536-7593 or 502-227-9661
- Kentucky Department of Agriculture
1-502-564-3956 or www.kyagr.com

KENTUCKY EPIDEMIOLOGIC NOTES & REPORTS

Printed With State Funds
by the
Commonwealth of Kentucky
Cabinet for Health and Family Services
Department for Public Health
275 East Main Street
Frankfort, Kentucky 40621

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In preparation for the probability of a pandemic influenza outbreak, the Division of Laboratory Services (DLS) has collaborated with the Division of Epidemiology and Health Planning, Kentucky Department for Public Health (DPH), and other agencies to develop a plan of preparedness that includes provisions for various issues and concerns that Kentucky may face in the event of a pandemic. This current plan is an expansion of the DLS seasonal influenza surveillance guidelines and mirrors the U.S. Department of Health and Human Services (HHS) Pandemic Influenza plan. Seasonal influenza surveillance continues as a collaboration between DPH, DLS, and health care providers (sentinel sites) who voluntarily submit specimens to the state laboratory for influenza A testing, with testing results forwarded to the Centers for Disease Control and Prevention (CDC) for tracking of global influenza trends. Timely and accurate information is crucial, since influenza A viruses regularly cause seasonal epidemics in humans and have the potential to cause pandemics with marked morbidity and excess mortality.

The DLS pandemic flu plan addresses several key areas, including: detection, distribution of diagnostic reagents, surge capacity, training, and partnerships. For surveillance purposes, the DLS presently has the ability to distinguish types of influenza A virus (e.g., H1, H3, or H5) using test a polymerase chain reaction (PCR) procedure (viral transport media with cold packs) that is normally used for seasonal influenza analysis and identification will be used for the testing for H5. In the event of a pandemic, personnel from other division areas have been cross-trained to perform clerical duties and viral testing to address surge capacity. The DLS has provided packaging and shipping training to various health care providers statewide to ensure that influenza specimens are properly packaged and shipped in an expedient manner to provide timely results to health care providers and officials. Physicians and hospitals should submit samples for H5N1 testing only when the patient meets strict screening criteria, which include pneumonia or severe respiratory illness AND travel within 10 days of symptom onset to a country with documented H5N1 infection in poultry or humans. Detailed screening criteria can be found at <http://www.cdc.gov/flu/avian/professional/han020302.htm>. Clinicians who feel that their patient might meet these criteria should consult with their local health department's nurse epidemiologist or regional epidemiologist before submitting the specimen.

The state lab continues to work with the state pandemic influenza committee as well as with hospitals and health departments. We can hope to achieve a level of awareness that may not prevent a pandemic, but will allow us to identify it early, when it arrives.